L 37728-65 EWP(e)/EWT(m)/EWP(w)/EPF(c)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)
Pf-4/Pf-4 IJP(c) MJW/JD/DJ

ACCESSION NR: AR5015169 UR/0137/65/000/005/G038/G038

42
40
G

SOURCE: Ref. zh. Metallurgiya, Abs. 5G227

AUTHOR: Fedorchenko, I. M.; Kryachek, V. M.

TITLE: New metalloceramic friction materials

CITED SOURCE: Tr. 7 Vses. nauchno-tekhn. konferentsii po poroshk. metallurgii. Yerevan, 1964, 186-189

TOPIC TAGS: metal ceramic material, friction material, copper base alloy, tin economy, tin containing alloy, metal mechanical property

ABSTRACT: A new metalloceramic friction alloy based on copper and containing [illegible] developed. The absence of tin lowers the [illegible] material by [illegible] technology of manufacturing the new material [illegible]

[illegible] material has an increased [illegible] material is [illegible]

L 57728-65
ACCESSION NR: AR5015169

2

new alloys are easily worked in, and after tests, the friction surface had no [illegible] type. The material has successfully passed tests in the clutches of friction drives and other machines. V. Kvin.

SUB CODE: MI

ENCL: 00

40P
Card 2/2

SOURCE: Ref. zh. Metallurgiya, Abs. 5G228

AUTHOR: Fedorchenko, I. M.; Pugin, V. S.; Solonin, S. M.

TITLE: High porosity metalloceramic materials for cleaning air and aggressive gases

SOURCE: Tr. 7 Vses. nauchno-tekhn. konferentsii po poroshk. metallurgii. [illegible], 1968, 251-254

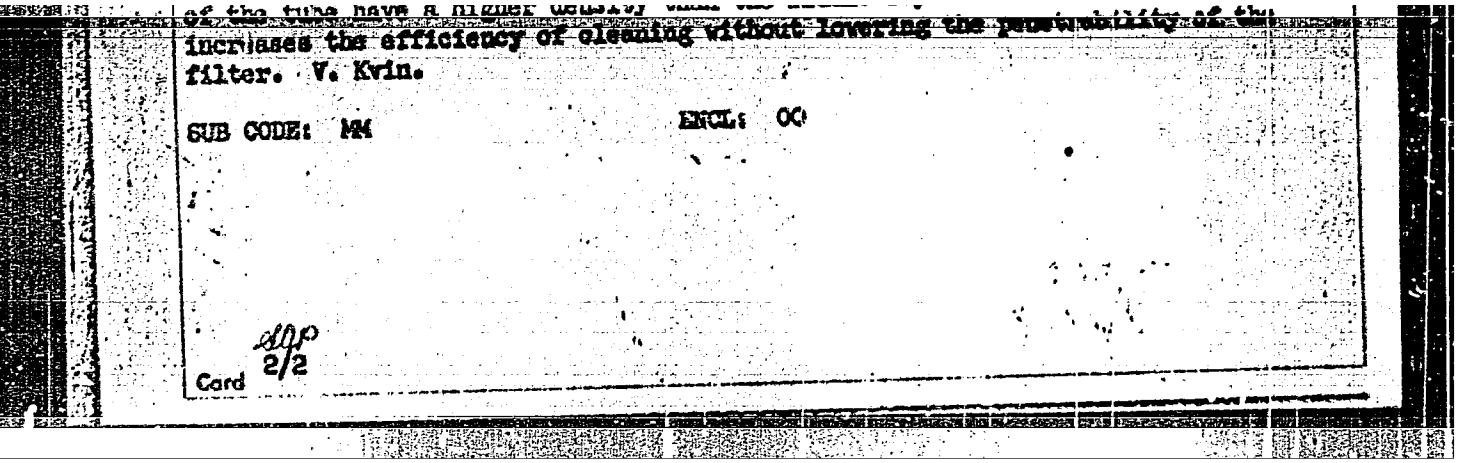
TOPIC TAGS: filter material, powder metal, stainless steel, metal ceramic material, air filter, gas filter, furnace gas, porous metal

TRANSLATION: Technology has been developed for the manufacture, on an extrusion press, of large dimension tubular filters made of non-spherical powders of [illegible]

APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412610008-9"

L 57727-65
ACCESSION NR: AR5015170

strengthen metalloceramic steels. Tubes were made of Kh17N2 steel powder, with a diameter of 100 mm, a length of up to 0.5 m, a wall thickness of 4-6 mm, and a porosity of 70%; these tubes were for cleaning blast furnace gas. Sintering of the tubes was done in purified hydrogen at 1200-1250° for 2-7.5 hrs, with an intermediate holding period of 1 hr at 600-800° for elimination of the plasticizer. The sintered products had $sigma_b$ equal to 5-10 kg/mm^2, $sigma_b$ equal to 0.5-1.5 kg/mm^2. [Translator's note; Two $sigma_b$ in original.] The pores are uniformly distributed over the whole length of the tube, while the outer layers of the tube have a higher density than the middle layers. Such a pore distribution increases the efficiency of cleaning without lowering the permeability of the



of the type have a higher density than the [illegible] of the
increases the efficiency of cleaning without lowering the permeability of the
filter. V. Kvin.

SUB CODE: MM ENCL: 00

Card 2/2

L 51871-65 EWP(e)/EWT(m)/EPF(c)/EWA(d)/EWP(t)/EWP(k)/EWP(z)/EWP(b) Pf-4/Pad
ACCESSION NR: AP5008271 IJP(c) JD/HW/WB S/0226/65/000/003/0035/0041

AUTHORS: Fedorchenko, I. M.; Denisenko, E. T.; Miroshnikov, V. N.

TITLE: Study of the scaling resistance of some nickel materials. Communication 1

SOURCE: Poroshkovaya metallurgiya, no. 3, 1965, 35-41

TOPIC TAGS: powder metallurgy, sintered metal, nickel, oxidation resistance

ABSTRACT: Air or water at high temperature and pressure contains enough free oxygen to form scale on nickel materials. Suitable additives which can be used to prevent oxidation and which also satisfy other requirements are carbon, zinc oxide, and talc. The average product contains 92% nickel and 8% additive and is made at a temperature of 1000C or higher. Specimens of such materials of 15-mm diameter and 100-mm length were exposed to temperatures of 500, 600, and 700C for 110 hours, and the weight increase per unit of surface was measured. Details are given on the behavior of four different materials in contact with air and with steam. The weight increase in air amounted to an average of 10 mg per cm^2 after 110 hours. In steam, the weight increase goes up to 1½% but remains almost constant after 1000 hours. However, negative values were obtained for nickel-carbon materials under the same conditions. The relations between time, oxygen content, oxygen distribution hardness and brittleness, temperature and time of agglomeration are briefly

Card 1/2

L 51871-65
ACCESSION NR: AP5008271

mentioned. Orig. art. has: 2 tables and 7 figures.

ASSOCIATION: Institut problem materialovedeniya AN UkrSSR (Institute for Material Science, AN UkrSSR)

SUBMITTED: 04Apr64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 002

Card 2/2

FEDORCHENKO, I.M.; CHAYKA, B.I.

Investigation of the mechanical properties of powder metal steels obtained by sintering mixtures of iron and graphite powders. Poroshk. met. 5 no.1:45-51 Ja '65. (MIRA 18:10)

1. Institut problem materialovedeniya AN UkrSSR.

FEDORCHENKO, I.M.; SOLONIN, S.M.

Studying the sintering of a chromium powder. Poroshmet. 5 no.11:26-31 N '65. (MIRA 18:12)

1. Institut problem materialovedeniya AN UkrSSR. Submitted March 1, 1965.

FEDORCHENKO, I.M.; DENI[illegible]ENKO, S.T.; MIROSHNIKOV, V.N.

Studying changes in the mechanical properties of packing material during the oxidation process. Report No.2. Poroshk. met. 5 no.4:57-60 '65. (MIRA 18:5)

1. Institut problem materialovedeniya AN UkrSSR.

FEDORCHENKO, I.M.; PANAIOTI, I.I.; DERKACHEVA, G.M.

Investigations in the field of friction materials. Poroshk. met. 5 no.5:54-57 My '65. (MIRA 18:5)

1. Institut problem materialovedeniya AN UkrSSR.

FEDORCHENKO, I.M.; PANAIOTI, I.I.; DERKACHEVA, G.M.; DZYKOVICH, I.Ya.; GORDAN', G.N.

Studies in the field of friction materials. Report No.2. Porosh. met. 5 no.9:65-68 S '65. (MIRA 18:9)

1. Institut problem materialovedeniya AN UkrSSR i Institut elektrosvarki imeni Patona AN UkrSSR.

FEDORCHENKO, I. M.; IVANOVA, I. I.

"Investigation of the activated sintering of porous iron."

paper scheduled to be presented at Intl Powder Metallurgy Conf, New York City, 14-17 June 1965.

Ukr SSR Acad Sci.

ANDRIYEVSKIY, R.A.; FUGIN, V.S.; FEDORCHENKO, I.M.; TEVEROVSKIY, B.Z.

Porous ceramic metal material from stainless steel. Porosh. met. 5 no.1:20-31 Ja '65. (MIRA 18:10)

1. Institut problem materialovedeniya AN UkrSSR.

FEDORCHENKO, I.M.; KOROBKO, M.I.; PUGIN, V.S.; MARTYNYUK, G.F.; KORNIYENKO, P.A.; KISELEV, Yu.Ye.

Using ceramic metal filters for the purification of samples of flue gas from open-hearth furnaces. Porosh. met. 5 no.10: 100-106 0 '65. (MIRA 18:11)

1. Institut problem materialovedeniya AN UkrSSR.

(A) L 13267-66 EWP(e)/EWT(m)/EWP(w)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c)

ACC NR: AP6001478 JD/WW/DJ/WH SOURCE CODE: UR/0226/65/000/012/0079/0082

AUTHOR: Chayka, B. I.; Fedorchenko, I. M.; Vologdin, V. V. 51 B

ORG: Institute of Materials Research, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR); Scientific Research Institute of High-Frequency Currents (Nauchno-issledovatel'skiy institut tokov vysokoy chastoty)

TITLE: Sintering of powdered-metal piston rings by means of induction heating

SOURCE: Poroshkovaya metallurgiya, no. 12, 1965, 79-82

TOPIC TAGS: powder metal, antifriction material, piston ring, powder metal sintering, induction furnace, pearlite

ABSTRACT: The Institute of Materials Research AN UkSSR has developed a Fe-base antifriction material (1.35% graphite, 2% Cu, 4% ZnS) for the production of piston rings for internal combustion engines. When sintered in an electric muffle furnace at 1180°C for 2 hr, these powdered-metal rings are 1.5 times as strong and elastic as rings of gray cast iron. To speed up the sintering process, the rings began to be sintered in an L3-13 induction heating installation (10 kw) at a frequency of 300-450 cps in an air atmosphere, on optimizing the graphite content of the charge (1.5-1.75%) so as to assure obtaining a material with wear-resistant pearlitic structure. It was ex-

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L 13267-66

ACC NR: AP6001478

perimentally established that the optimal sintering time is 35-40 sec (I_{system} = 0.2 a, I_{anode} = 0.9 a, U_{heater} = 7 v). Orig. art. has: 2 tables, 4 figures.

SUB CODE: 11, 20/ SUBM DATE: 12May65/ ORIG REF: 003/ OTH REF: 000

Card 2/2

(N) L 12165-66 EWP(e)/EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) MJW/JD/WW/JG/DJ/WH

ACC NR: AP5028373 SOURCE CODE: UR/0369/65/001/005/0567/0570

AUTHOR: Fedorchenko, I. M.; Filatova, N. A.; Pushkarev, V. V.

ORG: Institute of Problems in Metal Studies, AN UkrSSR, Kiev (Institut problem materialovedeniya AN UkrSSR)

TITLE: Antifriction properties of iron-base cermets

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 1, no. 5, 1965, 567-570

TOPIC TAGS: antifriction material, cermet, iron alloy, metal ceramic material, sulfide, metal physical property

ABSTRACT: The authors studied the properties of several new cermets based on iron and compared the properties with those of BK babbitt. The test compositions of the materials were prepared from a reduced iron powder (PZh1M1 GOST 9849-61) with various additives by sintering in a hydrogen atmosphere at temperatures from 1050 to 1200C. The main conclusion is that the introduction of sulfides into iron-base metal-ceramic materials is an effective means of improving their antifriction properties. The introduction of zinc sulfides makes it possible to reduce the friction coefficient of iron-base cermet antifriction materials to 0.006 and to increase the setting pressure limit to 100 dan/cm^2. Orig. art. has:

Card 1/2

L 12166-66

ACC NR: AP5028373

1 figure and 1 table.

SUB CODE: 11 / SUBM DATE: 15Oct65 / ORIG REF: 004

Card 2/2

(N) L 13018-66 EWT(d)/EWT(m)/EWP(e)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(h)/EWP(z)/EWP(b)/EWP(l) LJP(c) MJW/JD/WW/HW/DJ/WH/MJW(CL)

ACC NR: AP5028374 SOURCE CODE: UR/0369/65/001/005/0571/0576

AUTHOR: Fedorchenko, I. M.; Bulanov, V. Ya.; Makshantsev, G. F.

ORG: Institute of Problems of Metal Studies, AN UkrSSR, Kiev (Institut problem materialovedeniya AN UkrSSR); Orenburg Branch, Kuybyshev Polytechnic Institute (Orenburgskiy filial Kuybyshevskogo politekhnicheskogo instituta)

TITLE: Investigation of the properties of a nickel-graphite antifriction alloy

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 1, no. 5, 1965, 571-576

TOPIC TAGS: antifriction alloy, metal property, nickel alloy, graphite, alloy composition, compressive strength, metal oxidation, durability

ABSTRACT: The authors have conducted a study of the technology of the preparation and of certain properties of a graphite-nickel composition, because data on methods of preparation and on the properties of such metal-graphite compositions are extremely limited in scope. An NP nickel powder (99.41% Ni; 0.18% Co; 0.03% Cu; 0.04% Fe; 0.01% Si; 0.10% O; and 0.01% C), EUT-1 graphite powder, and a calcium-silicon composition (28.7% Ca; 59.1% Si, and iron and other mixtures) were used in the samples. It is found that the introduction of calcium-silicon into a nickel-graphite charge makes it possible to obtain a nickel framework-die with pores filled with graphite without sweating out of the metal. One of the

Card 1/2

L 13018-66
ACC NR: AP5028374

nickel-graphite compositions tested has a compressive strength 1.5 to 2 times greater than that of AG1500, and can withstand a specific pressure during the friction process up to 10 dan/cm^2 operating at temperatures of 20 to 300C. The compositions examined are oxidation resistant at temperatures of 20 to 300C. Two of the alloys tested can operate for 10 hr with insignificant wear at loads up to 10 dan/cm^2 and 300C. Type AG1500 alloys, impregnated with various resins, lead, or babbit, can operate at high loads, but fail when subjected to heating to 220C in oxygen. The friction coefficient of the composition examined at loads of 7.5 to 30 dan/cm^2 and 300C varies between 0.814 and 0.150, dropping with increasing graphite content. Orig. art. has: 2 figures and 3 tables.

SUB CODE: 11 / SUBM DATE: 15Oct64 / ORIG REF: 004 / OTH REF: 003

Card 2/2

L 11424-66 EWP(e)/EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) [illegible]/JD/WW/JG/JJ/

ACC NR: AP6002114 WH SOURCE CODE: UR/0369/65/001/006/0670/0674 91 79

AUTHOR: Fedorchenko, I. M.; Draygor, D. A. (deceased); Mamykin, E. T.

ORG: Institute of Materials Science Problems, AN UkrSSR, Kiev (Institut problem materialovedeniya AN Ukr SSR)

TITLE: Wearing in of iron-base cermet materials 16 27 16,44 4

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 1, no. 6, 1965, 670-674

TOPIC TAGS: iron, aluminum, zinc sulfide, oleic acid, antifriction material, lubricant additive, cermet wear material, boron compound

ABSTRACT: The effect of iron and aluminum organosols, boron nitride, zinc sulfide, and oleic acid as active additives to lubricants on the initial period of operation of friction couples was studied on samples of 2FP iron-base antifriction material (containing 4% ZnS and 1.5% graphite). The samples had a ferrite-pearlite structure. The additives were found to improve the operation of the friction couple considerably during the wearing-in period. They make it possible to carry out the wearing in of the couple at high initial specific pressures, and if the lubrication system is reliable, they protect the rubbing surfaces from gripping. A change in the content of additive in the lubricant

Card 1/2

2

L 14424-66

ACC NR: AP6002114

substantially alters the qualitative characteristics of the process. Thus, the additive content which decreases the wear of an antifriction bushing most effectively and the minimum friction coefficient are observed at a content which gives the longest wearing-in period. A composite additive (zinc sulfide + oleic acid) has been obtained which improves the performance of a friction couple during the initial period. Orig. art. has: 1 figure and 1 table.

SUB CODE: 11 / SUBM DATE: 21Nov64

Card 2/2

L 10645-66 EWT(d)/EWP(e)/EWP(w)/EWT(m)/ETC/EWG(m)/EWP(v)/T/EWP(t)/EWP(k)/EWP(h)/EWE(b

ACC NR: AP6002116 EWP(1) IJP(c) SOURCE CODE: UR/0369/65/001/006/0683/0687

JD/WW/RM/DJ/AT/WH 44

AUTHOR: Fedorchenko, I. M.; Pugina, L. I.; Ponomarenko, N. Ye. 44

ORG: Institute of Materials Research, AN UkrSSR, Kiev (Institut problem materialovedeniya, AN UkrSSR) 44

TITLE: Antifriction properties of materials acting as dry lubricants 11,44

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 1, no. 6, 1965, 683-687

TOPIC TAGS: solid lubricant, friction coefficient, friction

ABSTRACT: The antifriction properties of powder lubricants have been studied in butt surface sliding friction at high velocities. The following materials were tested: graphite, mica, talcum, boron nitride, molybdenum disulfide, zinc and copper sulfides, and mixtures of certain sulfides with 30, 50, and 80% graphite. The experiments were conducted on MIT-1 equipment which makes it possible to attain butt sliding velocities (v) of up to 50 m/sec within a wide range of loads (P). It was shown that for v = 10 m/sec and P = 0.68 d/cm^2, ZnS, talcum, BN and mica layers undergo rapid destruction. Graphite and CuS form deposits up to 1 μ thick on the counterbody, but MoS_2 forms abrasive grooves. In comparative tests conducted with machine oil-lubricated powder specimens, v could be increased to 44 m/sec and P to 2--3.5 d/sec. The friction coefficient dropped with an increase of v and P. The wear and the friction coefficient of such dry lubricants as graphite or MoS_2 dropped with a decrease in

Card 1/2

L 10645-66

ACC NR: AP6002116

grain size. Addition of graphite lowered the wear and the friction coefficient of sulfides and improved their effectiveness at high sliding velocities. At friction velocities of up to 35 m/sec, MoS_2, graphite, and mixtures of graphite with MoS_2, ZnC or CuS can be used as components of cermets intended for service in dry friction or with limited lubrication. Orig. art. has: 4 fig. and 2 tables. [BO]

SUB CODE: 11/ SUBM DATE: 15Oct64/ ORIG REF: 004/ OTH REF: 011/ ATD PRESS: 4169

HW

Card 2/2

L 34395-66 EWT(m)/EWP(t)/ETI IJP(c) JD/WB

ACC NR: AP6003323 (N) SOURCE CODE: UR/0365/66/002/001/0075/0079

55
52
B

AUTHOR: Miroshnikov, V. N.; Fedorchenko, I. M.

ORG: Institute for Problems of Material Science, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Oxidation of some bronzes and ferrosilicon in steam

SOURCE: Zashchita metallov, v. 2, no. 1, 1966, 75-79

TOPIC TAGS: metal oxidation, oxidation kinetics, steam turbine, bronze, silicon compound

ABSTRACT: Turbine parts designed to work in steam at high temperatures should possess good corrosion resistance, high mechanical strength, and sufficiently long working life (20,000 - 30,000 hours). Pure copper practically does not oxidize in steam, but its mechanical strength is too low for turbine parts. An investigation was made of a number of bronzes, containing no tin, and of FeSi by observing the kinetics of oxidation from the increase in weight of the samples subjected to the action of steam for up to 100 hr at 560C. Samples of the bronze AZhMts10-3-1.5 and FeSi had a high initial oxidation rate, which decreased to a very small rate after 12-14 hr. The large increase in weight suggested that neither should be used for work in high-temperature steam. The samples of the bronzes AZhN10-4-4, AMts9-2, and B2, as well as copper, had

Card 1/2 UDC: 620.193.52

a low oxidation. The increase in weight of copper was only 0.035 mg/cm^2. The curves depicting the increase in weight at 560C as a function of time (21 and 100 hr) showed that the resistance to oxidation in the alloys investigated decreased in the following sequence: bronzes AMts9-2, B2, KMts3-1, AZh9-4, and alloy FeSi. The maximum increase in weight of the bronzes AMts9-2 and B2 was 0.13 and 0.21 mg/cm^2, respectively. A stable, strong, and dense oxidation film was formed on these bronzes. It was concluded that bronzes AMts9-2, B2, KMts3-1, and AZh9-4 have the highest resistance to oxidation among all the materials investigated. The FeSi and bronze AZhMts10-3-1.5 have oxidation rates one order higher and are considered inapplicable for work in steam at elevated temperatures. Orig. art. has: 4 fig., 3 formulas, and 4 tables.

SUB CODE: 11,10 / SUBM DATE: 10May65/ OTH REF: 006 / ORIG REF: 006/

Card 2/2 BLG

L 33147-66 EWT(m)/EWP(e)/EWP(j)/EWP(k)/EWP(t)/ETI IJP(c) JD/HW/RM

ACC NR: AP6015349 (N) SOURCE CODE: UR/0226/66/000/005/0024/0028

48

AUTHOR: Fedorchenko, I. M.; Kostornov, A. G. 13

ORG: Institute for Problems in the Science of Materials, AN UkrSSR (Institut problem materialovedeniya AN USSR)

TITLE: Investigation of the properties of materials obtained by extrusion and sintering of plasticized powder mixtures 14

SOURCE: Poroshkovaya metallurgiya, no. 5, 1966, 24-28

TOPIC TAGS: porosity, copper, tensile strength, powder metal sintering, metal extrusion, nickel, copper, carbon, plasticizer

ABSTRACT: The results of an investigation are presented for sintering porous samples obtained by extrusion of carbonyl nickel and electrolytic copper powders in a mixture with an organic plasticizer. Data are given on the shrinkage, tensile strength, and porosity of samples for comparison with the theoretical and experimental results obtained on highly porous compacts and loose powder samples. Orig. art. has: 5 figures and 1 table. [Based on author's abstract.] [AM]

SUB CODE: 11/ SUBM DATE: 15Dec65/ ORIG REF: 011/ OTH REF: 001

Card 1/1

L 46663-66 EWP(e)/EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/WW/JG

ACC NR: AP6009572 (N) SOURCE CODE: UR/0226/65/000/011/0026/0031

AUTHOR: Fedorchenko, I. M.; Solonin, S. M.

ORG: Institute for the Study of Materials, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Study of the sinterability of chromium powder

SOURCE: Poroshkovaya metallurgiya, no. 11, 1965, 26-31

TOPIC TAGS: powder metal sintering, chromium, porous metal, porosity, brittleness

ABSTRACT: The article deals with an investigation of the possibility of fabricating highly porous Cr products (in particular, for use in filters) at lower sintering temperatures. The Cr powder used was produced by the technology described by B. A. Borok et al. (Polucheniye i primeneniye poroshka khroma dlya izgotovleniya metallokeramicheskikh izdeliy, TsITEIN, vyp. 5, 1961). Its chemical composition: 99.5% Cr, 0.05% C, 0.05% N_2, 0.2% Fe, 0.03% Si. The particles were at most ~8 μ in size, and their shape was dendritic. This type of powder is relatively nonporous, and poorly pressed and sintered unless a binder is used. The addition of 4 wt.% paraffin as a binder assured the production of satisfactory briquets with the porosity of 50-55%. Sample briquets with and without the addition of paraffin and with various porosities were sintered at 1373, 1423 and 1473°K for 0.25, 0.5, 1 and 2 hr. in hydrogen with a dew point

Card 1/2

L 47380-66 EWT(m)/EWP(v)/T/EWP(t)/ETI/EWP(k) SJP(c)

ACC NR: AP6029074 SOURCE CODE: UR/0413/66/000/014/0081/0081

INVENTOR: Miroshnikov, V. N.; Fedorchenko, I. M.

ORG: none

TITLE: Metal-ceramic sealing material on a copper base. Class 40, No. 183943 [announced by Institute of Problems in Science of Materials, AN UkrSSR (Institut problem materialovedeniya AN USSR)]

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 81

TOPIC TAGS: packing material, metal ceramic, sealing material

ABSTRACT: An Author Certificate has been issued for a copper-base metal-ceramic sealing material containing aluminum and graphite. To increase the corrosion resistance and mechanical strength at high temperatures, the material contains (wt %): 1—13 aluminum, 0.5—5.5 iron, 0.5—9.5 graphite, and remainder copper. [Translation] [NT]

SUB CODE: 11/ SUBM DATE: 13Mar65/

Card 1/1 mjs UDC: 669.35'715'15-194:621.762

L 47292-66 EWT(m)/T/EWP(w), EWP(t)/ETI IJP(c) DJ/JD

ACC NR: AP6030733 (A,N) SOURCE CODE: UR/0021/66/000/008/1015/1017

AUTHOR: Tykhonovych, V. I. --Tikhonovich, V. I.; Markovs'kyy, Ye. A. -- Markovskiy, Ye. A.; Fedorchenko, I. M. (Academician AN UkrRSR)

ORG: Institute of Foundry Problems, AN URSR (Instytut problem lyttya AN URSR)

TITLE: Hysteresis of antifriction properties of materials under conditions of boundary friction in heating and cooling

SOURCE: AN UkrRSR. Dopovidi, no. 8, 1966, 1015-1017

TOPIC TAGS: hysteresis, antifriction property, boundary friction

ABSTRACT: The author shows that external heating followed by subsequent cooling produces hysteresis in the antifriction properties of materials in friction. This is explained by the fact that for a period of time the contacting surfaces retain the physicomechanical properties which are true for higher temperatures. This is due to phase transformations in the structure of the metal at the surface of contact. The article was presented by Academician I. M. Fedorchenko of the AN UkrRSR. [SP]
Orig. art. has: 2 figures. [Based on authors' abstract]
SUB CODE: 11 SUBM DATE: 26Nov65/ ORIG REF: 003/

Card 1/1 Bearing Materials

ACC NR: AP6034196 SOURCE CODE: UR/0369/66/002/005/0552/0555

AUTHOR: Fedorchenko, I. M.; Filatova, N. A.; Klimenko, A. V.; Afanas'yev, V. F.; Polushko, A. P.

ORG: Institute of the Science of Materials, AN UkrSSR, Kiev (Institut problem materialovedeniya AN UkrSSR)

TITLE: Antifriction properties of iron based powder metallurgy products in dry friction

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 5, 1966, 552-555

TOPIC TAGS: dry friction, antifriction material, powder metallurgy, ~~product~~, iron base alloy, iron powder, friction coefficient

ABSTRACT: A study has been made of the antifriction properties of iron based powder metallurgy products in dry friction. The antifriction materials were prepared from PZh1M1 reduced iron powder with such additives as PM2 reduced copper powder zinc sulfide powder and/or KLS graphite powder (GOST's 5279-62, 4960-4[illegible], 3657-54, and 5279-61, respectively). The other member of the friction couple was a steel roller (steels 45 or 40X, or 1X18N9T nitrided steel). The experiments were conducted on the MI-1M friction machine at a constant speed of 0.9 m/sec. Addition of copper powder or zinc sulfide to the iron-graphite-base increased the load at the onset of seizure from 5 to 50—60 kg/cm^2, stabilized the friction process, and lowered the friction coefficient by 500—600%. Study of the friction surface with a UV microscope showed that the increase of wear resistance and the lowering of the friction

Card 1/2

ACC NR: AP6034196

coefficient on addition of ZnS is due to the formation of a protective sulfide film. However, an increase of ZnS content over 10% adversely affected the mechanical properties of the powder metallurgy products. An iron-based material with added 1.5% graphite, 2% copper and 8 to 10% zinc sulfide is recommended for operations in dry friction with 45 steel. Orig. art. has: 6 figures and 1 table.

SUB CODE: 11/ SUBM DATE: 31Mar65/ ORIG REF: 004/ OTH REF: 004/

Card 2/2

ACC NR: AP6036896 /M/ SOURCE CODE: UR/0226/66/000/011/0035/0038

AUTHOR: Fedorchenko, I. M.; Denisenko, E. T.; Krautman, V. R.

ORG: Institute for Problems in Science of Materials AN UkrSSR (Institut problem materialovedeniya AN UkrSSR); Leningrad Coke and Gas Plant (Leningradskiy kaksogazovyy zavod)

TITLE: Comparative investigations of properties of nickel-graphite-material from powders of electrolytic and carbonyl nickel

SOURCE: Poroshkovaya metallurgiya, no. 11, 1966, 35-38

TOPIC TAGS: nickel graphite material, metal powder, electrolytic nickel, nickel powder

ABSTRACT: The replacement of electrolytic nickel powder by a carbonyl leads to an improvement of the strength properties and chemical stability of nickel-graphite materials. The degree of dispersion and the graphite-ash content do not appreciably affect the strength properties. Orig. art. has: 4 figures and 3 tables. [Based on authors' abstract] [NT]

SUB CODE: 11/SUBM DATE: 18Feb66/ORIG REF: 002/

Card 1/1

SAMSONOV, G.V., otv. red.; GRIGOR'YEVA, V.V., kand. tekhn. nauk, red.; YEREMENKO, V.N., red.; NAZARCHUK, T.N., kand. khim. nauk, red.; FEDORCHENKO, I.M., akademik, red.; FRANTSEVICH, I.N., akademik, red.; YAROTSKIY, V.D., red.; GILELAKH, V.I., red.

[High-temperature inorganic compounds] Vysokotemperaturnye neorganicheskie soedineniia. Kiev, Naukova dumka, 1965. 471 p. (MIRA 18:12)

1. Akademiia nauk URSR, Kiev. Instytut problem materialoznavstva.
2. Chlen-korrespondent AN Ukr.SSR (for Yeremenko, Samsonov).
3. Akademiya nauk Ukr.SSR (for Fedorchenko, Frantsevich).

GUSNIYEV, M.A.; FEDORCHENKO, I.V.

Three-way mercury manometer with a recording lever. Fiziol. zhur. 45 no.8:1032-1033 Ag '59. (MIRA 12:11)

1. From the department of physiology, Dagestan Medical Institute, Makhatchkala.
(MANOMETRY, equipment & supplies)

FEDORCHENKO, N.G., aspirant

Effectiveness of some anthelmintics against paramphistomiasis in cattle. Veterinariia 42 no.9:56-57 S '65.
(MIRA 18:11)

1. Vsesoyuznyy institut gel'mintologii imeni akademika Skryabina.

FEDORCHENKO, (POPADYUK), O. Ya.

see POPADYUK, O. Ya.

FEDORCHENKO, P. M.

FEDORCHENKO, P. M. -- "Rare Forms of the Clinical Course of Tuberculosis of the Kidneys." Kiev Order of Labor Red Banner Medical Inst imeni Academician A. A. Bogomolets. Kiev, 1955. (Dissertation for the Degree of Candidate of Medical Sciences)

SO: Knizhnaya letopis', No. 4, Moscow, 1956

FEDORCHENKO, P.M., kand.med.nauk

Problem of a vesicovaginal fistula of tuberculous origin. Ped., akush. i gin. 19 no.6:62-63 '57. (MIRA 13:1)

1. Urologicheskaya klinika (zav. - dots. O.V. Proskura) Kiyevskogo gosudarstvennogo instituta usovershenstvovaniya vrachey (dir. - dots. V.D. Bratus').
(FISTULA) (TUBERCULOSIS)

FEDORCHENKO, P.M., kand. med. nauk. (Kiyev, ul. Kominterna, d. 8, kv. 3)

Problem of differential diagnosis between tumors and some forms of tuberculosis of the kidney. Nov. khir. arkh. 5:45-48 S-O '58. (MIRA 12:1)

1. Kafedra urologii (zav. - dots. O.V. Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.
(KIDNEYS--DISEASES) (HEMATURIA)

FEDORCHENKO, P.M., kand.med.nauk (Kiyev, ul.Kominterna, d.8, kv.3)

Clinical manifestation of kidney tuberculosis during treatment with streptomycin, para-aminosalicylic acid, and phthivazid. Nov.khir.arkh. no.3:49-52 My-Je '59. (MIRA 12:10)

1. Kafedra urologii (zav. dotsent O.V.Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.
(KIDNEYS--TUBERCULOSIS) (STREPTOMYCIN)
(SALICYLIC ACID) (ISONICOTINIC ACID)

FEDORCHENKO, P.M., kand.med.nauk

Difficulties in the differential diagnosis of tuberculosis and of acute inflammatory diseases of the kidneys. Vrach. delo no.3:305 Mr '59. (MIRA 12:6)

1. Kafedra urologii (zav. - dots.O.V.Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.
(KIDNEYS--DISEASES) (KIDNEYS--TUBERCULOSIS)

FEDORCHENKO, P.M., kand.med.nauk

Case of prostatic sarcoma in a 5-year-old child. Urologiia 24 no.3: 58-59 My-Je '59. (MIRA 12:12)

1. Iz kafedry urologii (zav. - dots. O.V. Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.

(PROSTATE, neoplasms, sarcoma in child (Rus))
(SARCOMA, in inf. & child, prostate (Rus))

FEDICHENKO, P.M., kand.med.nauk

Clinical course and treatment of renal tuberculosis with calcification of caseous foci. Urologiia 24 no.4:66-67 Jl-Ag '59. (MIRA 12:12)

1. Iz kafedry urologii (zav. - dots. O.V. Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.
(TUBERCULOSIS, RENAL)

FEDORCHENKO, P.M., kand.med.nauk

Concentration of phthivazid in blood, urine and renal tissue in renal tuberculosis [with summary in French]. Probl.tub. 37 no.1: 104-106 '59. (MIRA 12:2)

1. Iz kafedry urologii (zav. - dots. O.V. Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey (dir. - dots. V.D. Bratus').
(TUBERCULOSIS, RENAL, ther.
isoniazid, distribution in kidneys, blood & urine (Rus))

FEDORCHENKO, P.M., kand.med.nauk

Closed renal trauma in children. Nov. khir. arkh. no.5:95-96 S-O '60. (MIRA 14:12)

1. Kafedra urologii (zav. - dotsent O.V.Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.
(KIDNEYS--WOUNDS AND INJURIES) (CHILDREN--DISEASES)

FEDORCHENKO, P. M., dotsent

Influence of thermal physiotherapeutic procedures on the temperature of the urinary bladder. Vrach. delo no.6:94-96 Je '62. (MIRA 15:7)

1. Kafedra urologii (zav. - prof. O. V. Proskura) Kiyevskogo instituta usovershenstvovaniya vrachey.

(THERAPEUTICS, PHYSIOLOGICAL) (BLADDER--DISEASES)

GOLOVA, O.P.; EPSHTEYN, Ya.V.; SERGEYEVA, V.N.; KALNIN'SH, A.I. [Kalnins, A.]; ODINTSOV, P.N.; MAKSIMENKO, N.S.; PANASYUK, V.G.; Prinimali uchastiye: MERLIS, N.M.; DURININA, L.I.; BISENIYETSE, S.K.[Biseniece, S.]; GUNDARS, A.Yu.; FEDORCHENKO, R.I.; MINAKOVA, V.I.

New method for the complete chemical processing of plant tissues. Gidroliz. i lesokhim. prom. 14 no.7:4-6 '61. (MIRA 14:11)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR (for Golova, Epshteyn, Merlis, Durinina). 2. Institut lesokhozyaystvennykh problem i khimii drevesiny AN Latviyskoy SSR (for Sergeyeva, Kalnin'sh, Odintsov, Bisenietse, Gundars). 3. Krasnodarskiy gidroliznyy zavod (for Maksimenko, Fedorchenko, Minakova). 4. Dnepropetrovskiy sel'skokhozyaystvennyy institut (for Panasyuk).

(Plant cells and tissues)
(Botanical chemistry)

FEDORCHENKO, R.Ya., inzhener.

Reinforced concrete ties on the track. Put' i put. khoz. no.7:26-28 Jl '57. (MLRA 10:8)

(Railroads--Ties, Concrete)

FEDORCHENKO, R.Ya.

Laying of continuous welded rails. Put' put.khoz. no.10: 4-5 O '59. (MIRA 13:2)

1. Glavnyy inzhener sluzhby puti, zdaniy i sooruzheniy Yugo-Zapadnoy dorogi, g.Kiyev.
(Railroads--Tracklaying)

FEDORCHENKO, R.Ya.

Continuous track anf reinforced concrete ties on Czechoslovakian railroads. Zhel.dor.transp. 42 no.2:82-86 F '60.
(MIRA 13:5)

1. Glavnyy inzhener sluzhby puti, zdaniy i sooruzheniy Yugo-Zapadnoy dorogi.
(Czechoslovakia--Railroads--Track)

AMELICHEV, I.V., kand.tekhn.nauk; FEDCHENKO, R.Ya., inzh.

Operational testing of railroad tracks with rail support made from reinforced concrete blocks. Biul.tekh.-ekon.inform.Nauch. tekh.sov.Min.putei soob. no.2:40-55 '60. (MIRA 15:5)
(Railroads--Track) (Precast concrete construction)

USHA, Ye.B.; FEDORCHENKO, S.N.

Invariants of linear electromagnetic circuits relative to signal shape and dynamic circuit parameters. Radiotekh. i elektron. 9 no.10:1882-1884 O '64.

(MIRA 17:11)

S/900/62/000/001/004/005
D222/D308

AUTHORS: Svenson, A.N. and Fedorchenko-Tikhiy, G.D.

TITLE: Amplitude-pulse modulation with variable cycle time

SOURCE: Akademiya nauk Ukrayins'koyi RSR. Instytut mashynoznavstva i avtomatyky. L'viv. Voprosy peredachi informatsii. no. 1, 1962, 94-104

TEXT: This paper describes the theoretical background and an experimental version of a multi-channel communication system with variable frequency of commutation. These systems are based on ensemble averaging instead of time averaging of signals. The frequency of sampling of information in each of the channels depends on the parameters of the signals transmitted along them. A computer device controls the frequency of commutation for the channels. The control is based on the first or second derivative of the signal, depending on the noise contents of the input signal. An experimental system is described and oscillograms of its performance are given. It was found that the pulse repetition frequency at the commutator output

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Amplitude-pulse modulation ...

could be reduced by a factor of 1.5-2 without deterioration of the oscillograms. There are 7 figures.

Card 2/2

FEDORCHENKO, T. P. Cand. Geograph Sci.

Dissertation: "Sketches on Development of Concepts on the Relief of the European USSR in Relation to the History of Russian Geographical Science(Till the End of XIX Century)" Moscow Oblast Podagogical Inst. 29 Dec. 1947.

SO: Vechernyaya Moskva, Dec. 47 (Project #17836)

FEDORCHENKO, T. P.

SHUBIN, V.F., professor.; FEDORCHENKO, T.P., kandidat geograficheskikh nauk.

Arshan'-Zel'men'. Priroda 44 no.1:95-98 Ja '55. (MLRA 8:2)

1. Stalingradskiy sel'skokhozyaystvennyy institut.
(Arshan'-Zel'men' Reservoir)

FEDORCHENKO, T.P.

Determining natural boundaries in dividing Odessa Province into physicogeographical regions. Nauch.dokl.vys.shkoly; geol.-nauki no.4:53-58 '58. (MIRA 12:6)

1. Odesskiy universitet, geologo-geograficheskiy fakul'tet, kafedra fizicheskoy geografii.
(Odessa Province--Physical geography)

AUTHOR: Fedorchenko, T.P., Dotsent 3-58-5-29/35

TITLE: On a Uniform System of a Physical-Geographical Division Into Districts (O yedinoy sisteme fiziko-geograficheskogo rayonirovaniya)

PERIODICAL: Vestnik Vysshey Shkoly, 1958, Nr 5, page 84 (USSR)

ABSTRACT: The author claims that notwithstanding the extensive literature on the question, there is as yet no uniform system for the physical-geographical division of the USSR into districts. Training aids on the USSR physical geography recommended to the universities and pedagogical institutes, as well as the higher school programs are by far not uniform and are sometimes contradictory. It is time to develope a uniform system as this will further the instruction in physical geography and will be of great practical significance. He refers to conferences convened in 1956 and 1957 by the Moscow and Kiyev universities where a taxonomic system of physical geographical units was adopted and several other decisions taken. The regular conference in February 1958 (at the Moscow University) summed up the results of the first stage of scientific-research work in this field.

Card 1/2

3-58-5-29/35

On a Uniform System of a Physical-Geographical Division Into Districts

ASSOCIATION: Odesskiy gosudarstvennyy universitet imeni I.I. Mechnikova (Odessa State University imeni I.I. Mechnikov)

AVAILABLE: Library of Congress

Card 2/2

FEDORCHENKO, T.P., kand.geograf.nauk

Gully control. Priroda 50 no.5:53-54 My '61. (MIRA 14:5)

1. Odesskiy gosudarstvennyy universitet.
(Odessa Province--Erosion)

FEDORCHENKO, V. A.

"Some Features of Threating Zirconium and its Alloys by Pressure, and the Effect of Various Conditions of Annealing on the Mechanical Properties of Zirconium", by I. D. Nikitin and V. A. Fedorchenko

Report presented at 2nd UN Atoms-for-Peace Conference, Geneva, 9-13 Sept 1958

FEDORCHENKO, V.A.

21(4) PHASE I BOOK EXPLOITATION SOV/[illegible]

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; yadernoye goryucheye i reaktornyye metally. (Reports of Soviet Scientists; Nuclear Fuel and Reactor Metals) Moscow, Atomizdat, 1959. 670 p. (Series: Its: Trudy, vol. 3. 8,000 copies printed.

Ed. (Title page): A.A. Bochvar, Academician, A.P. Vinogradov, Academician, V.S. Yemel'yanov, Corresponding Member, USSR Academy of Sciences, and A.P. Zefirov, Doctor of Technical Sciences; Ed. (Inside book): V.V. Pereversev and G.M. Pobelintseva; Tech. Ed.: E.I. Mazel'.

PURPOSE: This volume is intended for scientists, engineers, physicians, and biologists working in the production and peaceful application of atomic energy; for professors and students of schools of higher technical education where the subject is taught; and for people interested in atomic science and technology.

COVERAGE: This is volume 3 of a 6-volume set of reports on atomic energy, presented by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy, held in Geneva from September 1 to 13, 1958. Volume 3 consists of two parts. The first part, edited by A.I. Zubov, is devoted to geology, prospecting, concentration and processing of nuclear source material. The second part, edited by G.L. Zverev, includes 27 reports on metallurgy, metallography, processing technology of nuclear fuels and reactor metals, and neutron irradiation effects on metals. The titles of the individual papers in most cases correspond word for word with those in the official English language edition on the Conference proceedings. See SOV/2081 for the titles of the other volumes of the set.

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S/182/60/000/009/004/012
A161/A029

AUTHORS: Perlin, I.L.; Fedorchenko, V.A.

TITLE: On the Press Forging Technology for Uranium and Uranium Alloys

PERIODICAL: Kuznechno-shtampovochnoye proizvodstvo, 1960, No. 9, pp. 12 - 18

TEXT: The article presents a review of information on the technology of forging uranium. The information sources are American (A.I.M.E.), or in English language, including manuals; proceedings of two international conferences in Geneva (1955 and 1958). The two Soviet sources referred to (Refs. 5 and 15) are only mentioned. The first deals with pecularities of pressing beryllium, zirconium, uranium and thorium, and the latter with work safety. All illustrations are from foreign sources. There are 11 figures and 15 references: 9 English and 6 Soviet.

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78321
SOV/89-8-3-6/32

AUTHORS: Perlin, I. L., Nikitin, I. D., Fedorchenko, V. A., Nikulin, A. D., Reshetnikov, N. G.

TITLE: Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

PERIODICAL: Atomnaya energiya, 1960, Vol 8, Nr 3, pp 219-227 (USSR)

ABSTRACT: The choice of optimum thermomechanical conditions for working of uranium is complicated due to possibilities of allotropic transitions resulting in modifications having different plasticity and strength. Due to its high resistance to deformation and small heat capacity, uranium is often heated considerably during extrusion and rolling and changes from α into β phase. Deforming samples from 90 to 60 mm at 420° C by means of one stroke of a friction press, the temperature of the metal rises from 90 to 100° C. Strong oxidation also influences the temperature change in the metal during working. To enable the determination of conditions

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for working of uranium by forces of pressure, the authors investigated the rolling, pressing, drawing, and die forging of uranium. Figure 1 shows the influence of the temperature on the maximum permissible reduction per pass of 15-mm-wide cast uranium samples. Uranium is exceptionally sensitive to nonuniform distributions of deformations during rolling. For example, fine uranium strips (0.05-0.20 mm) may be obtained without fracture; reduction per pass 80-85%. The augmented plasticity is explained as due to negligible nonuniformities in the distribution of deformation in the rolled strip. However, when rolling cold thin plates with variable rolling direction, the resulting nonuniformities in deformations cause fracture of the metal. Figure 2 shows the results of investigations of the variation with temperature of the mean specific pressure p_{cp} of the metal on the rollers. The temperature increase in the metal during rolling at $t = 630^{\circ}$ C causes a transition into

Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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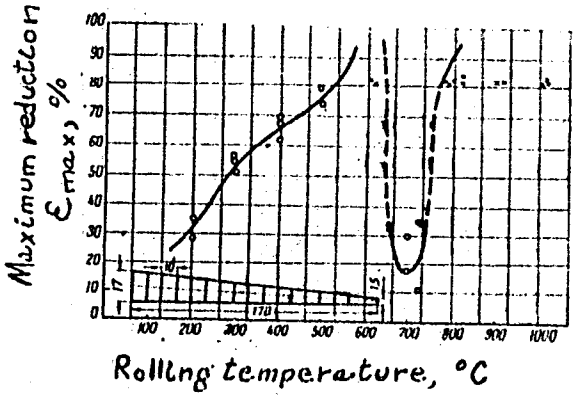

Fig. 1. Influence of temperature on rollability of uranium: (x) no fracture of samples was observed.

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Some Force and Deformation Characteristics

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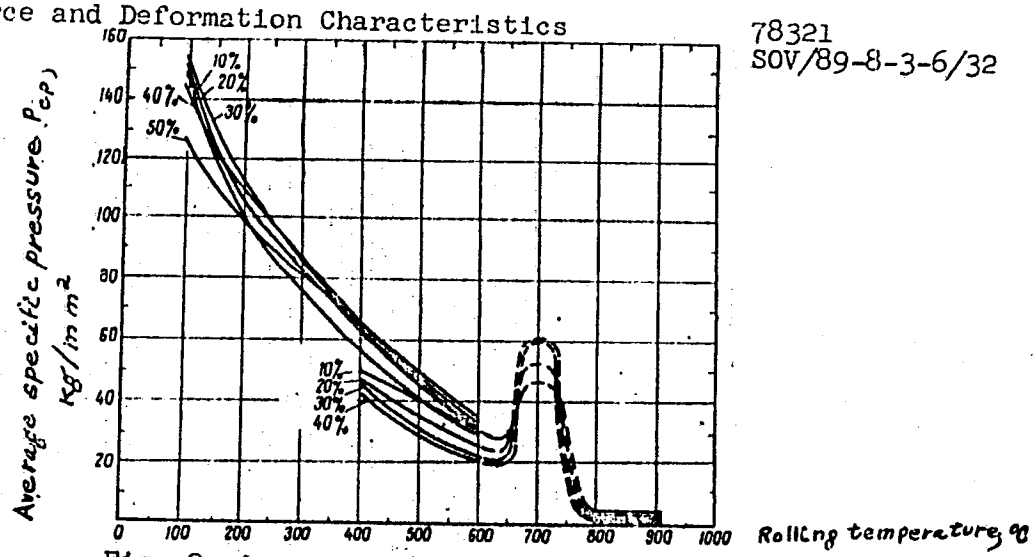

Fig. 2. Average specific pressure of metal on rollers versus the temperature: ——first series of tests; - - -second series of tests.

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the β phase which shows up as staggered oscillograms. The authors also investigated the mean specific pressure as function of the reduction at various temperatures and also as function of the initial state of uranium samples. They compared the results with the analytic equation of A. I. Tselikov (Prokatnye stany (Rolling Mills) M., Metallurgizdat, 1947) and found a satisfactory agreement:

$$p_{cp} = k\frac{2(1-\varepsilon)}{\varepsilon(\delta-1)}\left(\frac{h_H}{H}\right)\left[\left(\frac{h_H}{H}\right)^{\delta}-1\right],$$

where $\varepsilon = (H - h)/H$ is reduction; h_H, height of strip in the neutral cross section; $\delta = \mu\sqrt{2D/\Delta h}$ (μ = coefficient of friction; D = diam of rollers); $k = 1.15\, n_y\, \sigma_s$ (n_y = coefficient of strengthening; σ_s = yield limit in case of large plastic deformations). The value of n_y is function of the reduction

and temperature, and varies between 1 and 1.6. Figure 4 shows the absolute widening $\Delta b = B_1 - B$ of a square sample 21 x 21 x 180 mm with rollers 220 mm in diam as function of rolling temperature. The maximum of the curves is connected to the maximum of the friction coefficient which in the 900-950° C temperature region is equal to 0.4-0.45. The authors note that uranium can be extruded in the temperature interval between 250 and 1,000° C, and they discuss in detail the extrusion characteristics of γ- and α-uranium. They emphasize that during extrusion the uranium should not come in contact either with air or steel tools. Tools made from heat-resistant alloys, carbides, and ceramics with lubricants are used for extrusion of α-uranium. While extrusion velocities of γ-uranium are practically unrestricted, α-uranium is extruded using velocities between 1 and 400 mm/sec. The authors investigated further the extrusion stresses as function of extrusion ratio, temperature (see Fig. 6), and production mode of the sample. The extrusion stress depends linearly on

Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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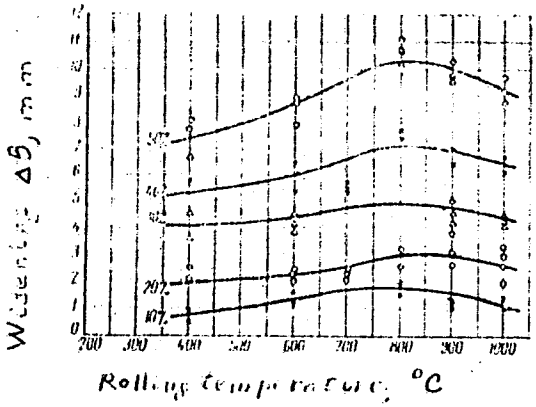

Fig. 4. Absolute widening of sample versus rolling temperature.

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Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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SOV/89-8-3-6/32

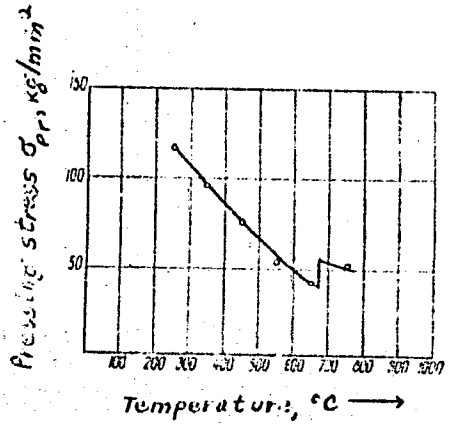

Fig. 6. Pressing stresses of uranium versus temperature.

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the integral index of the degree of deformation $i = \ln \mu$, and Figure 8 represents a nomogram whose cross-hatched region shows the influence of the scale-factor on the pressing stress when the ratio of the container diameters equals 5. The tests also showed that one can neglect the forces of contact friction. As seen from the nomogram, the lines pass through the coordinate origin, and therefore, the extrusion stresses σ_{pr} can be determined from the equation:

$$\sigma_{pr} = \frac{R_M + T_M}{F_n} = M_{pr} i,$$

In analogy with Young's modulus the authors call the coefficient M_{pr} the modulus of the extrusion stress. Figure 9 shows the variation of this modulus with temperature. Extrudability i_{pr} of the uranium metal, defined as:

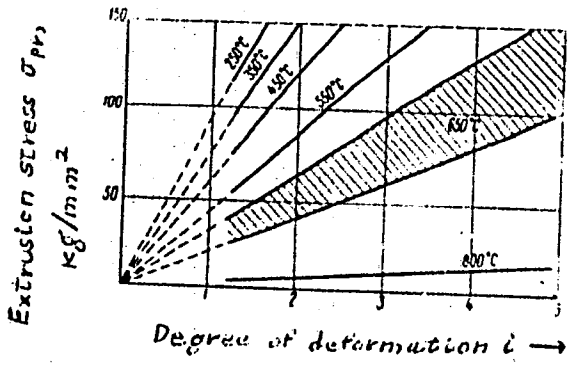

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Fig. 8. Nomogram for determination of extrusion stresses.

Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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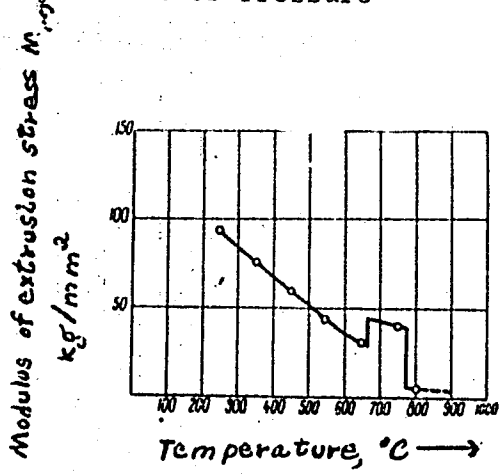

Fig. 9. Modulus of extrusion stress of uranium versus temperature.

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$$i_{pr} = \frac{\sigma_{pr}}{M_{pr}}.$$

is shown in Fig. 10, where the upper curve is the variation of the maximum extrudability under a pressure of 150 kg/mm^2, and the lower curve is obtained using σ_{pr} = 15 kg/mm^2. γ-Uranium has extrudability above 35. The authors discuss further the structure of the products and Table 2 exhibits the mechanical properties of the extruded uranium. The authors discuss various lubricants used during drawing, and present in Table 3 and on Fig. 11 some results concerning drawing of uranium. With heating one can obtain uranium wires 2 mm in diam and less. Modification of heating conditions allows the production of 0.1-mm uranium wires. Uranium can be die-forged in the α and γ temperature regions with ram velocities up to 6,000-7,000 mm/sec. Any transition into the β region due to overheating will cause

Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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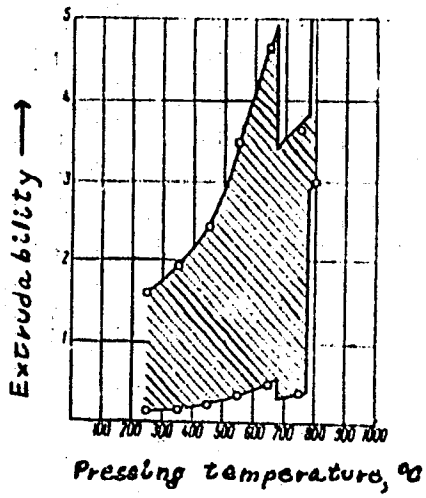

Fig. 10. Extrudability of uranium versus temperature.

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Table 2. Mechanical properties of extruded uranium. (a) Initial state of uranium; (b) tensile strength; (c) elongation; (d) reduction of area; (e) extruded at; (f) extruded in α -phase with subsequent hardening from β-phase.

a	b σ_b, kg/mm^2	c δ, %	d ψ, %
e, 350° C . . .	143,0	9,2	8,9
e, 730—750° C .	61,3	9,2	4,1
e, 900° C . . .	80,9	7,6	4,0
f	75,0	7,0	6,0

Note: (1) Each figure represents the arithmetic mean value from three measurements. (2) Small Gagarin-type samples were used during tests.

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Table 3. Drawing stress versus drawing ratio: (a) Initial state of uranium bar; (b) initial diam; (c) final diam; (d) drawing ratio per pass; (e) pulling force of drawing; (f) drawing stress; (g) annealed; (h) preliminarily deformed.

a	b, d_H (mm)	c, d (mm)	d, δ (%)	e, P_{dr} (kg)	f, σ_{dr} (kg/mm²)
g	11,45	10,7	12,7	1950	21,7
h	10,3	9,8	10,0	1700	22,5
	9,5	8,5	20	2650	47

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Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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SOV/89-8-3-6/32

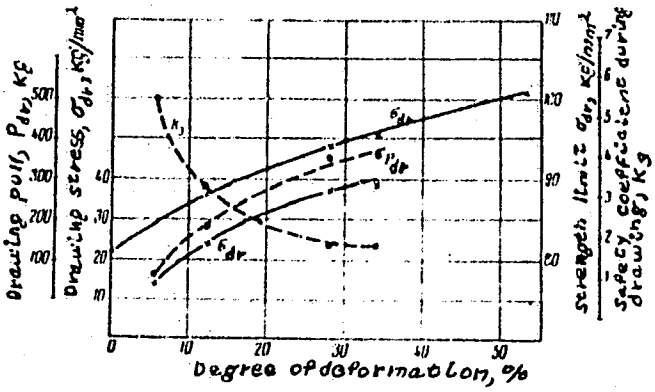

Fig. 11. Relationship between drawing parameters and drawing ratio per pass.

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Some Force and Deformation Characteristics of Working Uranium by Forces of Pressure

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SOV/89-8-3-6/32

crack formation. The authors also discuss briefly the conditions for flat die forging of α and γ uranium. There are 11 figures; 4 tables; and 5 Soviet references.

SUBMITTED: February 23, 1959

Card 17/17

PERLIN, I.L.; FEDORCHENKO, V.A.

Equipment and protective devices for the production of heat-releasing elements for atomic reactors. TSvet. met. 33 no.8:88-93 Ag '60. (MIRA 13:8)

(Nuclear reactors--Materials)
(Radiation protection)

KIRSANOV, I.T.; SERAFIMOVA, Ye.K.; SIDOROV, S.S.; TRUBENKO, V.F.; FARBEROV, A.I.; FEDORCHENKO, V.A.; SHILOV, V.N.

Eruption of the Ebeko Volcano from March to April, 1963. Biul. vulk. sta. no.36:66-72 '64. (MIRA 17:9)

FEDORCHENKO, V. D., RUTKEVICH, B. N., CHERNYI, E. M., SINELNIKOV, K. D., ZAYTSEV, A. G.

"Investigations of Magnetic Traps with a Space - Charge."

paper presented at the Fourth International Conference on Ionization Phenomena in Gases, 17-21 Aug 59, Uppsala, Sweden.

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AUTHORS: Fedorchenko, V. D., Rutkevich, B. N., Chernyy, B. M.

TITLE: Movement of an Electron in a Spacially Periodic Magnetic Field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1959, Vol 29, Nr 10, pp 1212-1218 (USSR)

ABSTRACT: The subject matter of the paper is a study of the movement of an electron in a magnetic field that is constant in time but is subject to a weak modulation in a longitudinal direction. The study is both of a theoretical mathematical as well as of an experimental nature. When an electric particle moves in a magnetic field that is being periodically but slowly changed, its magnetic moment, which is a ratio of the energy of the Larmor rotation of the particle to the intensity of the magnetic field, remains almost constant. In a movement of a particle in a spacially periodic field the total energy of the Larmor rotation of the particle remains constant, but while this energy decreases in the longitudinal direction it increases in the transverse direction, so that the velocity vector of the particle

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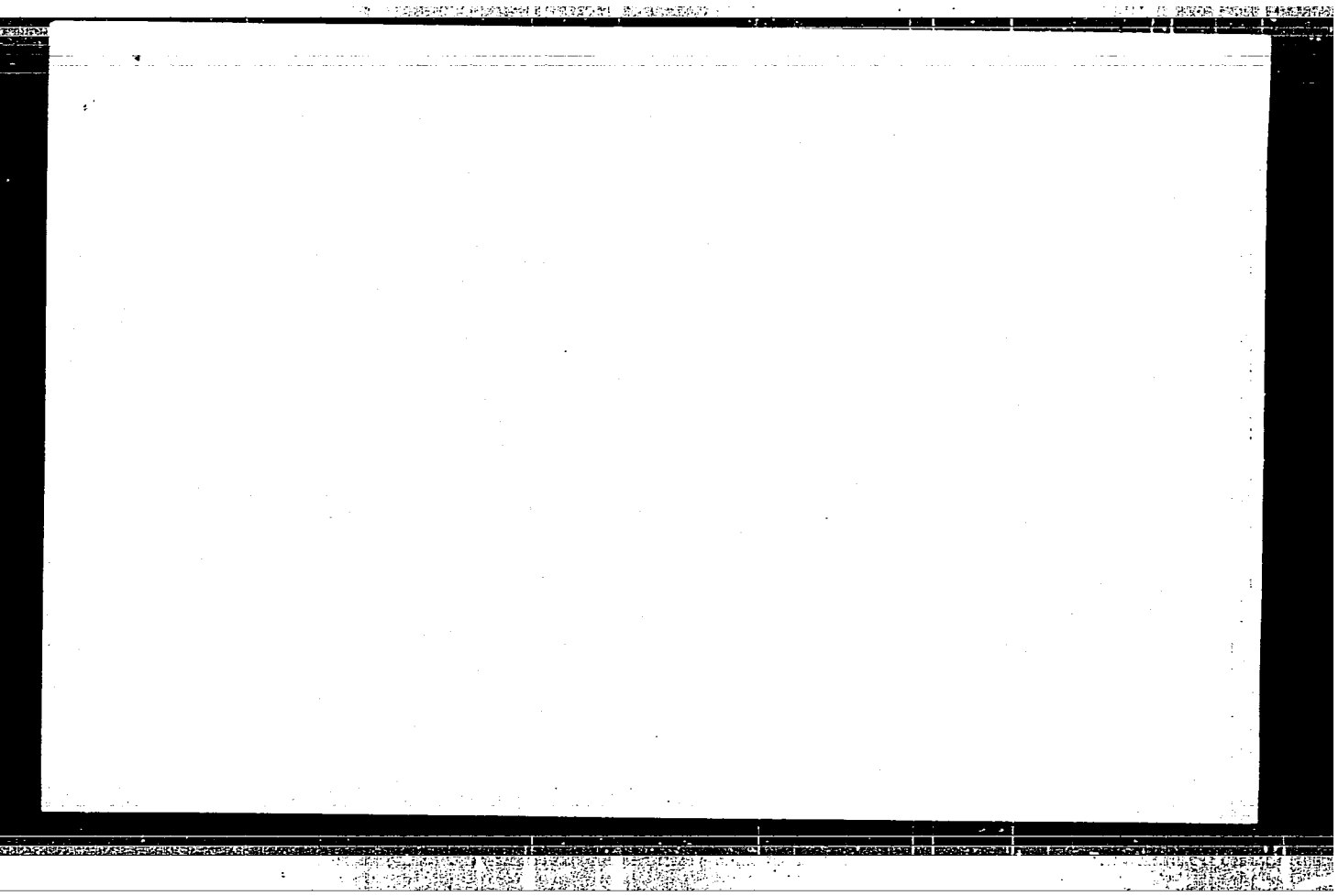
rotates with reference to the direction of the magnetic field. This phenomenon is being made use of when a modification of the magnetic moment of charged particles in a modulated magnetic field is desired. The major factor affecting the rotation of the velocity vector of the particle is the transverse component of the magnetic field. The force acting on the particle--an electron in this case--is proportional to the frequency ω of oscillations of the field. When this frequency equals the cyclotronic frequency ω_H ($\omega = \omega_H$), which represents a condition of resonance, the energy of the particle increases. When this total energy remains constant, then the more the velocity vector rotates the greater becomes the transverse component of velocity. Mathematical development of such a condition leads to a Mathieu equation. The experimental equipment used consisted of a copper cylinder in which a pressure of 10^{-5} to 10^{-6} mm Hg was maintained and over which the magnetic coils were wound. The constant magnetic field did not exceed 200 oersteds, and the maximum value of the modulating field was 60 oersteds. The measurements show that as the electrons pass through the modulated field their energy in the longitudinal



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AUTHORS: Sinel'nikov, K. D., Rutkevich, B. N., Fedorchenko, V. D.

TITLE: Motion of Charged Particles in a Spacially Periodical Magnetic Field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 249-255 (USSR)

ABSTRACT: As known, charged particles may be confined to a limited volume by means of magnetic fields of special shape (I. V. Kurchatov, Atomnaya energiya, 5, 105, 1958; G. I. Budker, Fizika plazmy i problema upravlyayemykh termoyadernykh reaktsiy (Plasma Physics and Problems of Controlled Thermonuclear Reactions) Vol III, Izd. AN SSSR, 1958). If the motion is adiabatic, the magnetic moment remains conserved. In such a case, charged particles remain indefinitely inside a cylindrically shaped magnetic field whose intensity increases at its ends, provided the angle between the velocity vector of the particle and the direction of symmetry (z-direction) of the

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magnetic trap is sufficiently large. However, the same kind of particles are also unable to enter into the trap, and to obtain trapping, one has to provide ways for making the motion inside the trap non-adiabatic. One possibility consists in working with fields which change slightly during the time of the Larmor precession of the particle:

$$\left|\frac{1}{H}\frac{dH}{dt}\right| \ll \omega_H, \qquad (2)$$

where

$$\omega_H = \frac{eH}{mc}$$

is cyclotron frequency. The authors investigated the motion of single particles in such weakly space-modulated fields, which they denote by $\mathbf{H}_0 + \mathbf{H}\sim$ where $\mathbf{H}_0$ is a strong magnetic field in the Z direction, and $\mathbf{H}\sim$ is the variable component. They described the modulating field by means of the vector

$\mathbf{h} = \mathbf{H} \sim / H_0$ with components:

$$h_x = \varepsilon h_1 \sin \nu z, \quad (5)$$

$$h_y = -\varepsilon h_2 \cos \nu z. \quad (6)$$

where h_1 and h_2 can be considered constant and $\varepsilon << 1$ for not too large displacements of the particle. A particle moving in such a combined field is subjected to a periodic force, and expermients showed (V. D. Fedorchenko, B. N. Rutkevich, B. M. Chernyy, ZhTF, XXIX, 1212, 1959) that a particle entering the system parallel to the Z-axis moves along a helix which spirals outwards. After a few periods of the $H \sim$ field, approximately half the total energy of the particle goes over into the energy of the Larmor precession. The particle velocity may ultimately reach a direction making a sufficiently large angle with the Z-axis to be trapped in the magnetic trap, and the variable field would, therefore, enable a successful injection of particles into the trap, provided the particle does not find its way out of the trap immediately after the first reflection. By varying the distance between.

the end of the periodic region and magnetic stopper, one can control the phase angle θ with which the particle is returning back into the periodic region, and achieve reflection also from the magnetic stopper at the entrance into the trap. To investigate the motion, one has to work with nonlinear equations of motion, which in the case of weak modulating fields $H \sim$ can be solved using asymptotic methods. The authors start from the equations of motion for the particle:

$$\frac{dv_x}{dt} = \omega_H [v_y (1 + \varepsilon h_1 \sin \nu z) + v_z \varepsilon h_1 \cos \nu z], \quad (7)$$

$$\frac{dv_y}{dt} = -\omega_H v_x (1 + \varepsilon h_1 \sin \nu z), \quad (8)$$

$$\frac{dv_z}{dt} = -\omega_H v_x \varepsilon h_1 \cos \nu z. \quad (9)$$

and deduce a system of equations for the velocity of the Larmor precession a and for the phase shift θ :

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$$\frac{da}{dz} = \varepsilon \frac{\omega_H h_1}{2} \cos \theta, \quad (32)$$

$$\frac{d\theta}{dz} = \frac{\omega_H}{v_\parallel} - \nu - \varepsilon \frac{\omega_H h_1}{2a} \sin \theta. \quad (33)$$

After introducing:

$$\alpha = \frac{a}{v_0} \text{ and } \Omega = \frac{\omega_{II}}{v v_0}.$$

they note that there exist singular values α_o and θ_o, functions of Ω, for which one obtains Larmor precession of particles on circles of constant radius. Trajectories are then discussed with respect to this special case. The authors supply on Fig. 2 the variation of the transverse velocity of particles entering into the periodic system parallel to the Z-axis. Depending on the value of initial energy, the transverse component first increases, and after reaching its maximum value goes back to zero.

Fig. 2. Change in velocity of Larmor precession of particles entering spacially periodical field parallel to the Z-axis. Numbers on graph denote values of the parameter $\Omega = \omega_H / \nu v_0$.

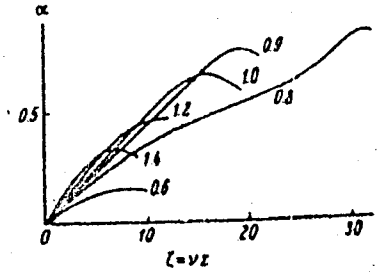
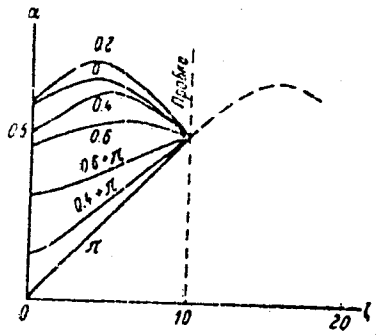


Figure 3 shows the change in α for particles which reflect from the magnetic stopper at the moment when the energy of transverse motion reached half of the total energy. One sees that there exists a region of $\Delta\theta$ values (close to π in the present case) for which the particle leaves the trap after only one reflection. Varying $\Delta\theta$ by changing the distance between the modulated field region and the magnetic

Fig. 3. Variations in Larmor precession velocity of returning particles for various values of the jump in phase shift θ at reflection from a magnetic stopper.



stopper, one may achieve a maximum trapping time. However, in case of presence of many charged particles, interaction effects start playing an important role, especially near the magnetic stopper, where the velocities are small and particles spend an appreciable amount of time. The quantity $\Delta\theta$ is no longer unique for all particles, and there exists then a

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finite probability that a particle acquires a "dangerous" value of $\Delta\theta$. The trapping time of the trap depends under these circumstances on the magnitude of that probability. The authors investigated experimentally the possibility of accumulation of particles in traps with space-periodic magnetic fields. There are 3 figures; and 5 references, 4 Soviet, 1 German.

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AUTHORS: Sinel'nikov, K. D., Fedorchenko, V. D., Rutkevich, B. N., Chernyy, B. M., and Safronov, B. G.

TITLE: Investigations of a Magnetic Trap

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 256-260 (USSR)

ABSTRACT: The authors investigated accumulation of charged particles in a magnetic trap with a space-periodic magnetic field. In general, a particle stays inside the trap if the angle φ between velocity vector and axis of the trap satisfies the inequality:

$$\sin^2\varphi > \frac{H_0}{H_n}, \qquad (1)$$

where H_0/H_n is the stopper ratio. To get a particle into the trap, one applies a space-periodic modulation

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of the magnetic field of the trap along its axis. As shown earlier (V. D. Fedorchenko, B. N. Rutkevich, B. M. Chernyy. ZhTF, XXIX, 1212, 1959. K. D. Sinel'nikov, B. N. Rutkevich, and V. D. Fedorchenko. ZhTF, XXX, 249, 1960), the magnetic moment of the particle is not conserved if magnetic field H_o and period of modulation L satisfy the condition:

$$\upsilon = \omega_H, \qquad (2)$$

where $\upsilon = 2\pi/L$ and $\omega_H = eH_o/mc$ - the cyclotron frequency. Particles injected in a direction parallel to the axis of the trap perform a Larmor precession with increased radius and, at the same time, decrease their longitudinal velocity. This results in a bending of the velocity vector with respect to the Z-axis, and putting a magnetic stopper at a sufficient distance from the entrance, so condition (1) is satisfied, the particle gets reflected and begins a

reverse motion. In general, it does not repeat the trajectory in the reverse direction and, therefore, need not cross the entrance stopper but, may stay inside the trap. This possibility of accumulation of particles was investigated by the authors using a device described earlier (Fedorchenko and others) and shown on Fig. 1.